UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/064,040	06/04/2002	Yen-Wu Hsieh		9770

27765 7590 09/17/2004

NAIPO (NORTH AMERICA INTERNATIONAL PATENT OFFICE)
P.O. BOX 506
MERRIFIELD, VA 22116

EXAMINER	
CARRILLO, BIBI SHARIDAN	
ART UNIT	**PAPER NUMBER**
1746	

DATE MAILED: 09/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/064,040	HSIEH ET AL.	
	Examiner	Art Unit	
	Sharidan Carrillo	1746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 August 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1, 3, 5, 7, 11, 12, and 14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1, 3, 5, 7, 11, 12, 14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1 and 7 are further indefinite because there is not a positive recitation of etching the wafer or preventing corrosion.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various

claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chang et al. (6273099).

Chang teaches a method of cleaning a wafer comprising dipping the water in a first cleaning vessel having a basic solution (52) and then dipping the wafer in a second cleaning vessel to perform a hot quick dump rinse process (54)(col. 2, lines 40-45, col. 3, lines 35-47). In reference to the limitations of injecting the heated DI water into the second cleaning vessel from the bottom of the second cleaning vessel, refer to col. 3, lines 48-60. In reference to claim 5, refer to Fig. 1, and col. 3, lines 15-17.

Chang et al. teach the invention substantially as claimed with the exception of the specific temperatures as recited in claim 1. In the abstract, Chang et al. teach rinsing with DI water heated to a temperature of at least 50°C. In col. 3, lines 65-67, Chang et al. further teaches that a higher water temperature may be used if desired for the effective removal of contaminants. It would have been with the level of the skilled artisan to increase the temperature of the DI water rinse, as taught by Chang et al. for purposes of effectively removing particles from the wafer surface.

7. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chang et al. (6273099) in view of applicant' admission of the prior art .

Chang et al. teach the invention substantially as claimed with the exception of the limitations recited in claim 3. In paragraph 5, applicant teaches that it is well known and conventional in the art to perform a quick dump rinse by bubbling DI water with CO2 to keep the solution in a weak acidic sate to neutralize the basic substances on the surface of the wafer and introducing the solution from the bottom of the cleaning vessel.

It would have been within the level of the skilled artisan to have modified the method of Chang et al. to include the conventional step of performing a quick dump rinse by bubbling DI water with CO2 for purposes of providing a solution in a weak acidic state to neutralize the basic substances present on the wafer surface.

8. Claims 1, 5, 7, 11-12, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ma et al. (6652666) in view of Chang et al. (6273099).

In reference to claim 1, Ma et al. teach dipping the wafer into a first cleaning vessel containing a basic solution (34) and transferring the wafer to a second cleaning vessel (38) to perform a quick dump rinse (Fig. 2). In reference to claim 7, refer to Fig. 1 of Ma et al. In reference to claims 1, 7, and 14, Ma et al. teach a quick dump rinse and a final rinse (Fig. 1, element 22, Fig. 2, element 40), but fails to teach a hot quick dump rinse and a final rinse at room temperature. Ma et al. further fail to teach introducing the DI water from the bottom of the cleaning vessel.

Chang et al. teach performing a quick dump rinse at temperatures greater than 50°C, followed by a final rinse at room temperature (Fig. 1, 54, 56). The quick dump rinse and final rinse provides adequate removal of residues remaining on the wafer surface. In reference to

injecting water into the second cleaning vessel from the bottom of the second cleaning vessel, refer to Fig. 2 of Chang et al.

It would have been obvious to a person of ordinary skill in the art to have modified the quick dump rinse and final rinse of Ma et al., to include a quick dump rinse at temperatures greater than 50°C, followed by a final rinse at room temperature, as taught by Chang et al., for purposes of effectively removing residues present on the wafer surface and further enhancing cleaning efficiency by eliminating the need for additional etching solutions.

Further, it would have been obvious to a person of ordinary skill in the art have modified the method of Ma et al., to include introducing the DI water from the bottom of the cleaning vessel since Chang et al. teach that introducing the water from the bottom of the vessel in a quick dump rinsing process is well known in the art.

Ma et al. in view of Chang et al. teach the method substantially as claimed with the exception of the limitations of the specified temperature limitations. In the abstract, Chang et al. teach rinsing with DI water heated to a temperature of at least 50°C. In col. 3, lines 65-67, Chang et al. further teaches that a higher water temperature may be used if desired for the effective removal of contaminants. It would have been with the level of the skilled artisan to increase the temperature of the DI water rinse, as taught by Chang et al. for purposes of effectively removing particles from the wafer surface.

In reference to claims 5 and 11, refer to col. 1, lines 55-60 of Ma et al. In reference to the limitations of the absence of a scrubber, refer to Figs. 1-2 of Ma et al. In reference to claim 12, refer to col. 2, lines 40-41 of Ma et al.

9. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ma et al. (6652666) in view of Chang et al. (6273099) as applied to claims 1, 5, 7, 11-12, and 14 as described in paragraph 8 above, and further in view of applicant's admission of the prior art.

Ma et al. in view of Chang et al. teach the invention substantially as claimed with the exception of the limitations recited in claim 3. In paragraph 5, applicant teaches that it is well known and conventional in the art to perform a quick dump rinse by bubbling DI water with CO2 to keep the solution in a weak acidic sate to neutralize the basic substances on the surface of the wafer and introducing the solution from the bottom of the cleaning vessel.

It would have been within the level of the skilled artisan to have modified the modified method of Ma et al. to include the conventional step of performing a quick dump rinse by bubbling DI water with CO2 for purposes of providing a solution in a weak acidic state to neutralize the basic substances present on the wafer surface.

Response to Arguments

10. The 112, second paragraph issues are maintained for the reasons set forth above.

11. The rejections of the claims under 102(b) and 103 by Tsao et al. are withdrawn in view of applicant's amendments.

12. The rejection of the claims under 102 (e) as being anticipated by Chang et al. is withdrawn in view of applicant's amendment.

13. The rejection of the claims under 103 by Chang et al., and Ma et al. in view of Chang et al., are maintained for the reasons as set forth below.

14. Applicant argues that none of the prior art (Chang et al., or Ma et al.) teaches hot QDR carried out without using a scrubber positioned over the second cleaning vessel. Applicant's

arguments are nonpersuasive since neither of the references teach scrubbers as further illustrated by their drawings. As a result, the negative limitations of the absence of a scrubber, as recited in the claims are met by the teachings of the prior art. Additionally, applicant further admits on page 5, line 20, that Ma et al. do not teach scrubbers.

15. Applicant further argues that Chang et al. do not teach injecting DI water from the bottom of the second cleaning vessel. Applicant is directed to col. 3, lines 53-57 which teaches delivery of the DI water through port 42 located at the bottom of the vessel.

16. Applicant argues that neither Ma et al. nor Chang et al. teach the benefits of shutting down the scrubber. Applicant's arguments are not persuasive because they are not commensurate in scope with the instantly claimed invention.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sharidan Carrillo whose telephone number is 571-272-1297. The examiner can normally be reached on Monday-Friday, 6:00a.m-2:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy P. Gulakowski can be reached on 571-272-1302. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Sharidan Carrillo
Primary Examiner
Art Unit 1746

bsc

SHARIDAN CARRILLO
PRIMARY EXAMINER